

23. (Amended) A display device as claimed in claim 22, further comprising:
a timing controller that controls a timing of transmitting the address signal,
and
a memory controller that controls the transmitting of the image signal, the
memory controller being integrated on a semiconductor or an insulating substrate and
integrally formed therewith.

24. (Amended) A display device as claimed in claim 1, wherein a D/A converter
is provided between said display drive and said memory cell that converts the image signal
comprising a digital signal stored in the memory cell into an analog signal, followed by
supplying to said display drive.

25. (Amended) A display device as claimed in claim 1, wherein said display drive
and said memory are directly coupled to supply the image signal comprising a digital signal
stored in said memory to said display drive.

26. (Amended) A display device as claimed in claim 25, wherein said display
drive performs digital drive through area tonal level, time-division tonal level or a
combination thereof.

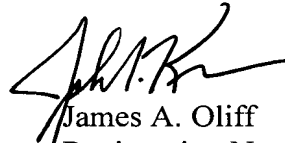
REMARKS

Claims 1-26 are pending. By this Preliminary Amendment, the Abstract, specification
and claims 1-26 are amended.

The attached Appendix includes marked-up copies of the substitute specification
(37 C.F.R. 1.125(b)(2)) and claims (37 C.F.R. 1.121(c)(1)(ii)).

Should the Examiner believe that anything further would be desirable in order to place this Application in better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

Respectfully submitted,



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Attachments:

Substitute Abstract

Substitute specification along with a marked-up copy showing the changes made thereto

Appendix

Date: 6/18/01

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APPENDIX

Changes to Abstract:

The following is a marked-up version of the amended Abstract:

———ABSTRACT OF THE DISCLOSURE

———~~To obtain a display device taking into consideration layout efficiency, etc., in the case of integrally forming a peripheral circuit on a glass substrate.~~

The invention provides a display device having, integrated on a substrate and integrally formed therewith, an active-matrix LCD section-2 having a plurality of scanning lines and a plurality of data lines formed in a grating form corresponding to dots, and active elements according to the respective intersections to perform display control using a liquid crystal by driving the scanning lines and the data lines.; The display device further including a row decoder 31 for selecting the scanning lines, a memory cell section 56 having memory cells that are in the number capable of storing an image signal for display control of dots in at least one row of a display drive section and allocated corresponding to the length in the row direction of the display drive section.; The display device further having a column decoder section 54 for selecting a memory cell to be stored with an inputted image signal, a column selection switch section 53 switching on the basis of a selection by the column decoder section 51 and the image signal and storing the image signal to the memory cell selected, and a k-bit DAC section 41 for driving a data line on the basis of the image signal stored in the memory cell section.

Changes to Claims:

The following is a marked-up version of the amended claims:

1. (Amended) A display device, comprising:

a display drive section having a plurality of scanning lines and a plurality of data lines formed in a grating form corresponding to dots as minimum units of display and

active elements provided corresponding to intersections, ~~to perform the display drive~~
performs display control using a liquid crystal by driving said scanning lines and said data
 lines;

a scanning line driver ~~section that selects and drives said scanning lines, the~~
scanning line driver being allocated corresponding to a length in a column direction of said
 display drive ~~section, to select and drive said scanning lines;~~

a memory ~~cell section having a plurality of memory cells that are in the~~
~~number~~ capable of storing an image signal for performing display control of dots in at least
 one row of said display drive, the memory being ~~section and~~ allocated corresponding to the
 length in a row direction of said display drive ~~section;~~

a column decoder ~~section allocated~~ corresponding to the length in the row
 direction of said display drive, ~~section, to select~~ the column decoder selects said memory cells
 for storing an input image signal;

a column selection switch section allocated corresponding to the length in the
 row direction of said display drive ~~section~~, to switch on the basis of a selection by said
 column decoder ~~section and~~ the image signal and storing the image signal to said memory
 cells selected by said column decoder ~~section;~~ and

a data line driver ~~section allocated~~ corresponding to the length in the row
 direction of said display drive, the data line driver drives ~~section, to drive~~ said data lines on
 the basis of the image signal stored in said memory ~~cell section, the data line driver further~~
being

_____ integrated on a semiconductor or an insulating substrate and integrally formed
 therewith.

2. (Amended) A display device, comprising:

a display drive ~~section~~ having a plurality of scanning lines and a plurality of data lines formed in a grating form corresponding to dots as minimum units of display and active elements provided corresponding to intersections, ~~to perform the display drive~~ performs display control using a liquid crystal by driving said scanning lines and said data lines;

a scanning line driver ~~section~~ that selects and drives said scanning lines, the scanning line driver being allocated to have a length in a column direction equal to or smaller than a length in a row direction of said display drive ~~section, to select and drive said scanning lines;~~

a memory ~~cell~~ ~~section~~ having a plurality of memory cells that are in the ~~number~~ capable of storing an image signal for performing display control of dots in at least one row of said display drive, ~~section and the memory being~~ allocated to have a length in a row direction thereof equal to or smaller than the length in the row direction of said display drive ~~section;~~

a column decoder ~~section~~ allocated to have a length in a row direction equal to or smaller than the length in the row direction of said display drive, ~~section, to select the~~ column decoder selects said memory cells for storing an input image signal;

a column selection switch section allocated to have a length in a row direction equal to or smaller than the length in the row direction of said display drive ~~section, to switch~~ on the basis of a selection by said column decoder ~~section~~ and the image signal and storing the image signal to said memory cells selected by said column decoder ~~section;~~ and

a data line driver ~~section~~ allocated to have a length in a row direction equal to or smaller than the length in the row direction of said display drive section, ~~to drive the data~~ line driver drives said data lines on the basis of the image signal stored in said memory ~~cell~~ ~~section, the data line driver further being~~

_____integrated on a semiconductor or an insulating substrate and integrally formed therewith.

3. (Amended) A display device, comprising:

a display drive ~~section~~ having a plurality of scanning lines and a plurality of data lines formed in a grating form corresponding to dots as minimum units of display and active elements provided corresponding to intersections, ~~to emit~~ the display device emits an organic EL elements connected to said active elements by driving said scanning lines and said data lines to perform display control;

a scanning line driver ~~section~~ that selects and drives said scanning lines, the scanning line driver being allocated corresponding to a length in a column direction of said display drive ~~section~~, ~~to select and drive said scanning lines~~;

a memory cell ~~section~~ having a plurality of memory cells that are ~~in the number~~ capable of storing an image signal for performing display control of dots in at least one row of said display drive, ~~section and~~ the memory being allocated corresponding to the length in the row direction of said display drive ~~section~~;

a column decoder ~~section~~ allocated corresponding to the length in the row direction of said display drive, ~~section, to select~~ the column decoder selects said memory cells for storing an input image signal;

a column selection switch section allocated corresponding to the length in the row direction of said display drive ~~section~~ to switch on the basis of a selection by said column decoder ~~section~~ and the image signal and storing the image signal to said memory cells selected by said column decoder ~~section~~; and

a data line driver ~~section~~ allocated corresponding to the length in the row direction of said display drive section, ~~to drive~~ the data line driver drives said data lines on the basis of the image signal stored in said memory ~~cell section~~, the data line driver further

being integrated on a semiconductor or an insulating substrate and integrally formed therewith.

4. (Amended) A display device, comprising:

a display drive ~~section~~-having a plurality of scanning lines and a plurality of data lines formed in a grating form corresponding to dots as minimum units of display and active elements provided corresponding to intersections, to emit an organic EL element connected to said active elements by driving said scanning lines and said data lines to perform display control;

a scanning line driver ~~section~~that selects and drives said scanning lines, the scanning line driver being allocated to have a length in a column direction equal to or smaller than a length in the column direction of said display drive~~section~~, to select and drive said scanning lines;

a memory ~~cell-section~~having a plurality of memory cells that are in-the number capable of storing an image signal for performing display control of dots in at least one row of said display drive~~section~~, section-and the memory being allocated to have a length in a row direction thereof equal to or smaller than the length in the row direction of said display drive~~section~~;

a column decoder ~~section~~allocated to have a length in a row direction equal to or smaller than the length in the row direction of said display drive~~section~~, to select the column decoder selects said memory cells for storing an input image signal;

a column selection switch section allocated to have a length in a row direction equal to or smaller than the length in the row direction of said display drive~~section~~, to switch on the basis of a selection by said column decoder ~~section~~ and the image signal and storing the image signal to said memory cells selected by said column decoder~~section~~; and

a data line driver ~~section~~ allocated to have a length in a row direction equal to or smaller than the length in the row direction of said display drive ~~section~~, ~~to drive the data line driver drives~~ said data lines on the basis of the image signal stored in said memory ~~cell~~ ~~section~~, the data line driver further being
 _____ integrated on a semiconductor or an insulating substrate and integrally formed therewith.

5. (Amended) A display device, comprising:

a display drive ~~section~~ having a plurality of scanning lines and a plurality of bit ~~lines~~ line, and a liquid crystal ~~controlled in display~~ that is controlled by driving the corresponding ~~said~~ scanning lines and bit lines and provided on a dot-by-dot basis as minimum units of display control, and formed in a matrix form;

a memory ~~cell~~ ~~section~~ having a plurality of memory cells that are ~~in the~~ ~~number~~ capable of storing an image signal for performing display control of dots in at least one row of the display drive ~~section~~ ~~and the memory being~~ allocated corresponding to the length in the row direction of said display drive ~~section~~;

a column decoder ~~section~~ allocated corresponding to the length in the row direction of said display drive ~~section~~, ~~and to select and~~ the column decoder selects the memory cells for storing an input image signal; and

a column selection switch section allocated corresponding to the length in the row direction of said display drive ~~section~~, to switch on the basis of a selection by said column decoder ~~section~~ and the image signal and storing the image signal to said memory cell selected by said column decoder ~~section~~, the column decoder being
 _____ integrated on a semiconductor or insulating substrate and integrally formed therewith.

6. (Amended) A display device, comprising:

a display drive ~~section~~ having a plurality of scanning lines and a plurality of bit lines, and a liquid crystal ~~controlled in display~~ that is controlled by driving the corresponding scanning lines and bit lines and provided on a dot-by-dot basis as minimum units of display control, and formed in a matrix form;

a memory ~~cell-section~~ having a plurality of memory cells that are ~~in the~~ ~~number~~ capable of storing an image signal for performing display control of dots in at least one row of said display drive, ~~section and the memory being~~ allocated to have a length in a row direction thereof equal to or smaller than the length in the row direction of said display drive-section, and each of the memory cells being connected to each of the bit lines;

a column decoder ~~section~~ allocated to have a length in a row direction equal to or smaller than the length in the row direction of said display drive, ~~section, to select the~~ column decoder selects said memory cells for storing an input image signal; and

a column selection switch section allocated to have a length in a row direction equal to or smaller than the length in the row direction of said display drive-section, to switch on the basis of a selection by said column decoder ~~section~~ and the image signal and storing the image signal to said memory cells selected by said column decoder-section, the column selection switch section being

_____integrated on a semiconductor or an insulating substrate and integrally formed therewith.

7. (Amended) A display device, comprising:

a display drive ~~section~~ having a plurality of scanning lines and a plurality of bit lines, and organic EL elements to be controlled in luminescent display by driving the corresponding scanning lines and bit lines and provided on a dot-by-dot basis as minimum units of control in display, and formed in a matrix form;

a memory cell-section having a plurality of memory cells that are ~~in the~~
~~number~~-capable of storing an image signal for performing display control of dots in at least
one row of said display drive, ~~section and the memory being~~ allocated corresponding to the
length in the row direction of said display drive-section, and each of the memory cells being
connected to each of the bit lines;

a column decoder ~~section~~-allocated corresponding to the length in the row
direction of said display drive, ~~section, to select~~ the column decoder selects said memory cells
storing an input image signal; and

a column selection switch section allocated corresponding to the length in the
row direction of said display drive-section, to switch on the basis of a selection by said
column decoder ~~section~~ and the image signal and storing the image signal to said memory cell
selected by said column decoder-section, the column selection switch section being
_____integrated on a semiconductor or an insulating substrate and integrally formed
therewith.

8. (Amended) A display device, comprising:

a display drive ~~section~~-having a plurality of scanning lines and a plurality of bit
lines, and organic EL elements to be controlled in luminescent display by driving the
corresponding scanning lines and bit lines and provided on a dot-by-dot basis as minimum
units of control in display, and formed in a matrix form;

a memory cell-section having a plurality of memory cells that are ~~in the~~
~~number~~-capable of storing an image signal for performing display control of dots in at least
one row of said display drive, ~~section and the memory being~~ allocated to have a length in a
row direction thereof equal to or smaller than the length in the row direction of said display
drive ~~section~~ and each of the memory cells being connected each of the bit lines;

a column decoder ~~section~~ allocated to have a length in a row direction equal to or smaller than the length in the row direction of said display drive ~~section~~, ~~to select the~~ column decoder selects said memory cells for storing an input image signal; and

a column selection switch section allocated to have a length in a row direction equal to or smaller than the length in the row direction of said display drive ~~section~~, to switch on the basis of a selection by said column decoder ~~section~~ and the image signal and storing the image signal to said memory cells selected by said column decoder ~~section~~, the column selection switch section

_____ integrated on a semiconductor or an insulating substrate and integrally formed therewith.

9. (Amended) A display device as claimed in claim 1 ~~any one of claims 1 to 8~~, wherein the number of said memory cells, which are ~~is~~ allocated corresponding to the length in the row direction of said display drive ~~section~~ and capable of storing the image signal for display control of the dots on one row of said display drive ~~section~~, is structured redundantly.

10. (Amended) A display device as claimed in claim 1 ~~any one of claims 1 to 8~~, wherein said memory ~~cell section~~ connects said memory cells in the number capable of storing an image signal for display control of the one-row dots to each of word lines in the number equal to the number of said scanning lines and is structured with a memory array corresponding to dot arrangement of said display drive ~~section~~, and

a word line driver that selects and drives ~~section for selecting and driving~~ said word lines are further integrated on and integrally formed with said substrate.

11. (Amended) A display device as claimed in claim 10, wherein, on the basis of an address signal representative of a display position and a storage position, said scanning line driver ~~section~~ selects said scanning lines and said word line driver ~~section~~ selects said word lines.

12. (Amended) A display device as claimed in claim 11, wherein the same address signal is inputted to said scanning line driver ~~section~~ and said word line driver ~~section~~.

13. (Amended) A display device as claimed in claim 11, wherein independent address signals are inputted to said scanning line driver ~~section~~ and said word line driver ~~section~~.

14. (Amended) A display device as claimed in claim 11, wherein said scanning line driver ~~section~~ operates to select and drive said scanning lines on the basis of the address signal only when a scanning line driver control signal is inputted, and said word line driver ~~section~~ operates to select and drive said word lines on the basis of the address signal only when a word line driver control signal is inputted.

15. (Amended) A display device as claimed in claim 11, ~~wherein~~ said column decoder section ~~selects~~ selecting the memory cell to store an inputted image signal on the basis of the address signal.

16. (Amended) A display device as claimed in claim 15, wherein one pixel comprises three dots provided for developing and displaying red, blue and green as light source colors, the image signal is inputted on the basis of a unit of one-pixel, and said column decoder ~~section~~ selects the memory cell in an amount of one pixel.

17. (Amended) A display device as claimed in claim 15, wherein one pixel comprises three dots provided for developing and displaying red, blue and green as light source colors, the image signal is inputted on the basis of a unit of a plurality of pixels, and said column decoder ~~section~~ selects the memory cell in an amount of a plurality of pixels.

18. (Amended) A display device as claimed in claim 1 ~~any one of claims 1 to 8~~, wherein an input interconnection for the image signal to be stored in said memory cell and

said column selection switch section are formed on a side opposite to said display drive section sandwiching said memory cell section therebetween.

19. (Amended) A display device as claimed in claim 1 ~~any one of claims 1 to 8~~, wherein said memory cell section is allocated with the memory cell corresponding to the length in the row direction of said display drive section and formed in a multi-stage structure.

20. (Amended) A display device as claimed in claim 10, ~~wherein~~ said word lines ~~being~~ are provided in the number of integer times the number of the scanning lines, and said memory cell section is ~~being~~ structured by a memory array connecting, by grouping, the memory cells in the number capable of storing the image signal for display control of the one-row dots of said display drive section to the word lines in the number of the integer times.

21. (Amended) A display device as claimed in claim 1 ~~any one of claims 1 to 8~~, wherein said memory cell section is structured by a memory array having the memory cells that are in the number capable of storing the image signal for display control of a plurality of rows of the dots of said display drive section and allocated corresponding to the length in the row direction of said display drive section.

22. (Amended) A display device as claimed in claim 1 ~~any one of claims 1 to 8~~, wherein said memory cell section is structured by a memory array having the memory cells that are in the number capable of storing the image signal for display control of a plurality of rows of the dots of said display drive section and allocated to have a length in the row direction equal to or smaller than the length in the row direction of said display drive section.

23. (Amended) A display device as claimed in claim 22 ~~any one of claims 11 to 22~~, further comprising:

a timing controller ~~section for controlling that controls a timing of transmitting~~ the address signal, and

a memory controller that controls the transmitting of~~section for controlling to~~
~~transmit the image signal, the memory controller being~~
_____integrated on a semiconductor or an insulating substrate and integrally formed
therewith.

24. (Amended) A display device as claimed in claim 1~~any one of claims 1 to 8~~,
wherein a D/A converter is provided between said display drive ~~section~~ and said memory cell
~~that converts~~~~section for converting~~ the image signal comprising a digital signal stored in the
memory cell into an analog signal, followed by supplying to said display drive ~~section~~.

25. (Amended) A display device as claimed in claim 1~~any one of claims 1 to 8~~,
wherein said display drive ~~section~~ and said memory ~~cell section~~ are directly coupled to supply
the image signal comprising a digital signal stored in said memory ~~cell section~~ to said display
drive ~~section~~.

26. (Amended) A display device as claimed in claim 25, wherein said display
drive ~~section~~ performs digital drive through area tonal level, time-division tonal level or a
combination thereof.